REMARKS

This AMENDMENT UNDER 37 CFR 1.111 is filed in reply to the outstanding Office Action of August 13, 2003, and is believed to be fully responsive thereto for reasons set forth below in greater detail.

Initially, it is noted that claim 1 is considered generic to all disclosed species, and accordingly if claim 1 is allowable, withdrawn claims 4-6 and 13-15 should be allowable therewith.

Reconsideration is respectfully requested of the objection to the drawings in paragraph 3, and the rejection under 35 USC 112 in paragraph 5, as the quoted phrase in paragraphs 3 and 5 should be "a subset of integrated circuit elements", not "a subset of integrated circuits."

Referring to Figures 1 and 2 as being exemplary of other illustrated embodiments, the "subset of integrated circuit elements having a minimum design width which is smaller that the width of other integrated circuits on said substrate" is clearly shown by the element having a sub-minimum width W2, which has a width smaller than the normal design line widths W1 of elements 12. The same type of feature is also shown by Figures 3 and 4, 5 and 6, 7 etc.

Regarding the rejection of claim 8 under 35 USC 112, claim 8 has now been cancelled.

Regarding the rejection of claim 1 under 35 USC 112 in paragraph 7, language similar to that kindly suggested by the Examiner has been inserted into claim 1.

Regarding the rejection on the basis that the "minimum normal design width" is relative, "normal" has been deleted and a further definition "produced by photolithography" has been inserted into claim 1.

Reconsideration is respectfully requested of the rejection of claims 1-3 and 7-12 under 35 USC 103 over Delpech et al, particularly in view of the clarifying amendments to claim 1 and the following comments on the distinctions and advantages of the present invention over Delpech et al.

Initially, with respect to the rejection of claim 1, the Examiner has stated " It would have been obvious to one of ordinary skill in the art at the time the invention was made to minimize the width of the integrated circuit element in Delpech's device in order to increase the density of the device".

The present inventor has responded by stating that it is not within the spirit or scope of the present invention to "increase the density of the device" by minimizing the width within the fuse neck. Neither Delpech nor the present invention disclose such a new structure, as both Delpech and the present invention employ different photolithographic means to reduce the width of the device, with the device having a first nominal minimum width, that establishes the density of all fuses, independent of the fact that it is an object of both Delpech and of the present invention to create a sub-minimum section of the fuse neck.

The present invention provides a superior fuse relative to Delpech, providing improvements in fuse density as compared to Delpech, reproducibility and control over the sub-minimum region, both in it's width and length dimensions, as well as its relative registration within the fuse neck.

Moreover, it should be pointed out that a limitation imposed by Delpech, which is also present in Delpech claim 1, is the utilization of "at least one dummy element having a spacing from said at least one second portion for providing an optical proximity effect during processing so that the second width is less than the first width".

Statement of Delpech Limitations:

1) Delpech requires the registration of at least one dummy shape 22, 23 in relation to the length L of the fuse in his Figure 3, so as to minimize the variation in R3 and Ra2.

2) In order to create the Delpech jogs of the fuse element 4 (for example in his Figure 8), the dummy shapes 22, 23 must contain non-orthogonal edges as shown in Figure 8. Structures having such edges are known in the art to produce significant non-systematic offsets in the proximity created shape of the fuse element 4, due to the inherent inability to resolve such shapes photolithographically. This provides unwanted substantial variations in both the width Wmin and the length of a Wmin feature.

Delpech in his best mode uses two dummy shapes 22, 23, one on either side of the fuse 4 in Figure 8, to produce a sub-minimum link Wmin. This compounds the situation described above in 2), which in the best mode has two jogs imaged in fuse 4, both having non-systematic errors. In addition the best mode of Delpech fuses uses three minimum images, images of the fuse 4, dummy shape 22 and dummy shape 23, for each fuse, thus decreasing the packing density of repeated fuse elements. Also, such dummy elements inadvertently create a thermal path to the substrate and subsequently can hinder the final programming of the fuse 4.

Statements of the superior structure and design of the present invention that teach away from the Delpech limitations above, numerically referenced to the above Statements of Delpech Limitations.

1) The length of the minimum width feature of the present invention is fixed by the original placement of the fuse jog and or space, and is not subject to a registration error of a neighboring dummy shape to the "active" fuse shape.

2) The minimum image of the present invention is created by recognizing a sub-minimum space or jog (all of which are orthogonal shapes) in an otherwise

continuous image bridging the two images with a third repeatable sub-minimum feature. We do not suffer from the edge translation of Delpech. As such, our fuse neck length can be of a minimum dimension as we do not have to incorporate the translation tolerance into the design of this fuse. Delpech must account for this, which may result in fuses that cannot be programmed when the non-systematic error translates into elements that when printed do not create a Wmin.

3) The present invention requires only one image per fuse, thus our fuse is by default able to be denser than Delpech's. It is apparent that the present invention has a density advantage over Delpech. Delpech's having one or two dummy shapes per fuse also imposes two other deficiencies. Delpech must deal with the thermal leakage into the dummy shapes, and provide a programming power to overcome this limitation. This limitation may result in inefficient programming of an intended element (i.e. more power and/or more time are required), and also in unwanted programming of neighboring fuses due to the self heating of the dummy shapes that will translate to neighboring fuses. Additionally, these dummy shapes will be subject to charging (as shown they are not contacted, if they were contacted Delpech's fuse density would further degrade). Such charging can unintentionally effect the programming of active fuse elements, in an uncontrolled sense.

Claim 1 now has the added limitation specifying that the two minimum design width end portions and the sub-minimum width center portion are produced simultaneously in one photolithographic operation.

This limitation distinguishes over the multi-step production of Delpech involving first photolithographic deposition as in Figure 7, and then etching while using the optical proximity effect to achieve the structure of Figure 8.

Moreover, claims 19 and 20 have been added to distinguish over the presence of the dummy shapes 22 and 23 of Delpech.

This application is now believed to be in condition for allowance, and a Notice of Allowance is respectfully requested. If the Examiner believes a telephone conference might expedite prosecution of this case, it is respectfully requested that he call applicant's attorney at (516) 742-4343.

Respectfully submitted,

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